

How does it work?

The birds enter the Freshline® SafeChill™ zone on the shackle. In this area, the air has been super-chilled by means of Liquid Nitrogen passing through a heat exchanger. The birds' surface is rapidly chilled resulting in a significant reduction of the campylobacter bacterium presence. After 30 to 50 seconds dependent on the needs, the birds exit the chamber and their surface immediately recuperates to room temperature, without any damage to the skin or meat quality.

The Freshline® SafeChill™ system ensures optimal efficiency by re-circulating the super-chilled air.

A process temperature is set, with variable air velocities to adjust treatment intensity.

Air Products takes care of the site installation, commissioning, training, project management and engineering.



About Air Products

Air Products' Freshline solutions offer you high-purity gases and equipment, international supply capability, and—most important—the unmatched industry experience and technical support to help you succeed. We can help you improve your productivity, lower your costs, maximize your returns, and, as a result, allow you to continuously grow in a very competitive market.

Next to our standard applications, we also offer custom made solutions to ensure your needs are met and your expectations reached, always.

For more information, please contact us at:

Air Products and Chemicals, Inc.
7201 Hamilton Boulevard
Allentown, PA 18195-1501
T 800-654-4567
F 800-272-4449
info@airproducts.com

tell me more
airproducts.com/food

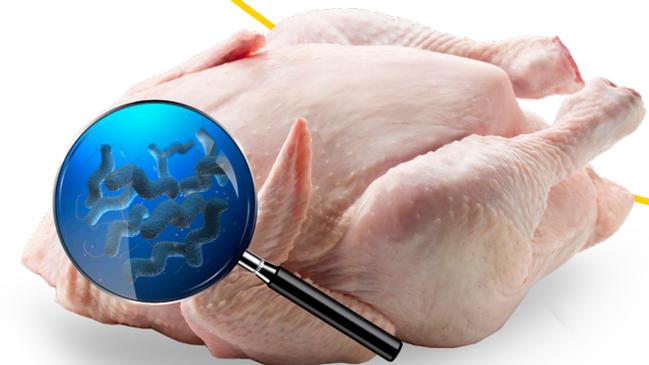


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Freshline® SafeChill™ System for Poultry

**The safe, effective and proven
solution for campylobacter
intervention**





Campylobacter, a challenge for the poultry industry

The Center for Disease Control (CDC) estimates campylobacter infection affects more than 1.3 million people every year. Most campylobacter infections are associated with eating raw or undercooked poultry or from contamination of other foods by these items. It takes very few campylobacter germs (fewer than 500) to make someone sick. That means a single drop of juice from a raw chicken can have enough campylobacter in it to infect someone.

Why use the Freshline® SafeChill™ system?

Highly effective: This indirect chilling intervention after evisceration reduces the campylobacter counts to acceptable levels. It can be used alone or to complement another intervention ensuring industry acceptance at all times.

Customizable: Modular & automated setup allowing to operate 3 shifts a day and to meet current and future production line speeds. Easily integrated in any production facility.

Safe: Safe in terms of operations.

Quality preserving: The quality of the product remains the same.

Precise: Precise temperature control and setup based on your needs.

Treatment time: 30-50 sec.

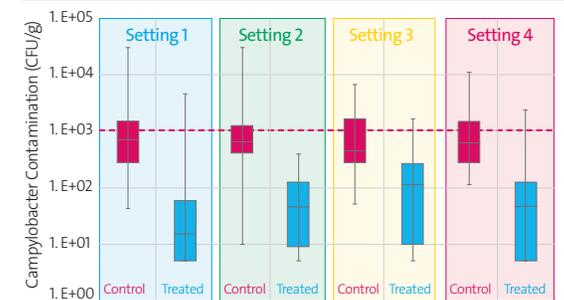
Air Products' experts have worked with poultry processors to develop a unique, patented, intervention to effectively reduce the campylobacter count on infected birds.

A proven intervention at industrial scale

Air Products' R&D team trialed multiple settings for the Freshline® SafeChill™ intervention. Comprehensive testing and data evaluation allowed the identification of the most effective SafeChill™ settings.

You can see here boxplots of exemplary results of different SafeChill™ treatments tested on 100 carcasses per setting.

Figure 1: Boxplots for control & treated sample groups using different FSC settings N=100 birds/control and N=100 birds/treated



Once the final settings were fine-tuned, various carcasses were tested before and after the SafeChill™ intervention. All samples were sent to an independent laboratory for analysis. You can see the results provided by the laboratory in **Figure 2**.

Figure 2: Before (magenta) and after (blue) comparison of treated birds showing the effect of the Freshline® SafeChill™ system.

